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TALEN ENERGY

SEP 2 9 2016

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

10 CFR 50.73

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 50-388(387)/2016-004-01
UNIT 2 LICENSE NO. NPF-22 **Docket No. 50-388**
UNIT 1 LICENSE NO. NPF-14 **50-387**
PLA-7534

References: 1. *Letter PLA-7503, "Unit 2 Experienced an Electrical Transient Resulting in a Manual Scram," dated July 12, 2016, (Accession ML16194A251).*

Attached is a supplement to Licensee Event Report (LER) 50-388(387)/2016-004-00. The LER reports an event where Unit 2 experienced an electrical transient which caused the loss of power to essential plant loads. Drywell cooling was subsequently lost and drywell pressure increased causing operators to manually scram the reactor. The automatic start signal on high drywell pressure was received for the A, C, and D Emergency Diesel Generators. A second reactor scram signal occurred and High Pressure Coolant Injection was overridden and declared inoperable, resulting in a Loss of Safety Function.

The power loss also tripped Reactor Building Heating Ventilation Air Conditioning causing a loss of secondary containment differential pressure resulting in a loss of safety function.

This event was determined to be reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in manual or automatic actuation of an ECCS system and 10 CFR 50.73(a)(2)(v)(C) as an event or condition that could have prevented fulfillment of a safety function.

There were no actual consequences to the health and safety of the public as a result of this event.

This letter contains no new regulatory commitments.

J. A. Franke

Attachment: LER 50-388(387)/2016-004-01

Copy: NRC Region I
Mr. J. E. Greives, NRC Sr. Resident Inspector
Ms. T. E. Hood, NRC Project Manager
Mr. M. Shields, PA DEP/BRP

NRC FORM 366 (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Susquehanna Steam Electric Station Unit 2	05000388	1 of 3

4. TITLE

Unit 2 experienced an electrical transient resulting in a manual SCRAM

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									Susquehanna Steam Electric Station Unit 1	05000387
05	13	2016	2016	- 004	- 01	09	29	2016	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
100	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☒ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMER *(Include Area Code)*
Nicole Pagliaro, Licensing Specialist - Nuclear Regulatory Affairs	(570) 542-6578

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	B	BKR	Nuclear Logistics Inc.	Y	X	E	HS	S250	Y

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

At 23:55 on 5/12/16, Unit 2 experienced an electrical transient resulting in a loss of 2B246 Reactor Building Engineered Safeguard System (ESS) Division 480 volt Motor Control Center (MCC) and 2Y246 208/120 Volt Alternate Current (AC) Instrument Panel. With the loss of the Reactor Building ESS Division 480 volt MCC, several drywell cooling fans were lost leading to an increase in drywell pressure. At 0110 on 5/13/16 Unit 2 was manually scrammed. All rods inserted as expected. Reactor water level lowered to -27 inches and was immediately restored by normal feedwater level control. Level 3 (+13 inch) Primary Containment Isolation System (PCIS) isolations occurred, along with an initiation of the Reactor Core Isolation Cooling (RCIC).

The direct cause of the transient was found to be a phase to ground short between a cable and a protruding screw in MCC bucket 2B246091, Drywell Area Unit Cooler 2V411B Breaker. The apparent cause is the vendor did not comply with Specification E1116, Rev 3 with this order of buckets. Immediate corrective actions included the repair of 2B246 which has been completed. A plan has been developed to review a sample of the 480 VAC MCC breakers and is being tracked by maintenance and system engineering.

NRC FORM 366A (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Susquehanna Steam Electric Station, Unit 2	05000388	2016	- 004	- 01

NARRATIVE

CONDITIONS PRIOR TO EVENT

Unit 1 – Mode 1, 100 percent Rated Thermal Power

Unit 2 – Mode 1, 100 percent Rated Thermal Power

2B246 Reactor Building Engineered Safeguard System (ESS) Division 2 480 volt Motor Control Center (MCC) (EIIS:B) and 2Y246 208/120 Volt Alternate Current (AC) Instrument Panel (EIIS:JL) were inoperable at the time of the scram.

It was discovered that the Manual Bypass Switch 2D666SW1 (EIIS:HS) was set to its alternate power source, via 2B246 AC ESS Bus (EIIS:JL). When the loss of 2B246 (EIIS:JL) occurred, power could not be swapped back over to its primary power source via 2D666 vital uninterruptable power supply (UPS) since the Manual Bypass Switch (EIIS:HS) was degraded. This led to the loss of power to panel 2Y629, which challenged operator response. The Manual Bypass Switch (EIIS:HS) had been in its degraded condition since May 6th 2015 when the UPS was being taken out of service and power was placed on its alternate supply via the Manual Bypass Switch (EIIS:HS). This event was reported under the NRC PIs as a Scram with Complications.

EVENT DESCRIPTION

At 23:55 on 5/12/16, Unit 2 experienced an electrical transient resulting in a loss of 2B246 Reactor Building Engineered Safeguard System (ESS) Division 2 480 volt Motor Control Center (MCC) (EIIS:B) and 2Y246 208/120 Volt Alternate Current (AC) Instrument Panel (EIIS:JL). With the loss of the Reactor Building ESS Division 480 volt MCC, several drywell cooling fans were lost leading to an increase in drywell pressure. Drywell pressure increased to 1.3 psig when operators placed the mode switch to the shutdown position to manually scram the reactor. At 0110 on 5/13 Unit 2 was manually scrammed. The automatic start signal on high drywell pressure was received at 0312 for the A, C, and D Emergency Diesel Generators (EIIS:EK). The B Emergency Diesel Generator was manually started from the control room. It did not automatically start in emergency mode due to the Unit 2 division 2 core spray not reaching an initiation signal on 1.72 psig. All rods inserted as expected. Reactor water level lowered to -27 inches and was immediately restored by normal feedwater level control. Level 3 (+13 inch) Primary Containment Isolation System isolations occurred, along with an initiation of the Reactor Core Isolation Cooling (RCIC) (EIIS:KI) system (-30 inches). The 'A' and 'B' Emergency Service Water pumps were manually started. Once adequate level was verified, RCIC was overridden. Pressure was controlled with turbine bypass valves, and subsequently Main Steam Line Drains. All safety systems functioned as expected.

The power loss also tripped Reactor Building HVAC (EIIS:VA), causing a loss of secondary containment differential pressure resulting in a loss of safety function.

Due to the loss of drywell cooling, high drywell pressure actuations and a second reactor scram signal occurred at 0314 hours. High Pressure Coolant Injection (EIIS code:BJ) was subsequently overridden and declared inoperable, resulting in a Loss of Safety Function.

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Susquehanna Steam Electric Station, Unit 2	05000388	2016	- 004	- 01

This event was determined to be reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in manual or automatic actuation of an ECCS system and 10 CFR 50.73(a)(2)(v)(C) as an event or condition that could have prevented fulfillment of a safety function.

CAUSE OF EVENT

The direct cause of the transient was found to be a phase to ground short between a cable and a protruding screw in MCC bucket 2B246091, Drywell Area Unit Cooler 2V411B Breaker (EIIS: B). The protruding screw damaged and/or abraded the wire insulation until the short occurred. In 2005, Susquehanna did a receipt inspection on MCC buckets from Nuclear Logistics Incorporated (NLI) and found the wiring routed from the bucket connection stabs on the rear panel were in very close proximity or were in contact with the mounting screws. The vendor was contacted and the specification E1116, was revised to include that the screws should not protrude more than two threads from the back plate of the bucket. The apparent cause of the event is that the vendor did not comply with Specification E1116, Rev 3 with this order of buckets.

ANALYSIS/SAFETY SIGNIFICANCE

The actual consequences of this event were the Unit 2 loss of 2B246 and 2Y246 (EIIS:JL). With the loss of 2B246 (EIIS:JL), several drywell cooling fans were lost leading to an increase in drywell pressure. Operations manually scrammed the reactor prior to the Automatic Scram on high drywell pressure. Following the scram, drywell pressure continued to rise and the automatic start signal was received for the A, C, and D Emergency Diesel Generators.

The failure also resulted in four Maintenance Rule Functional Failures (MRFFs) and 12.58 hours of 2B246 MCC unavailability.

The potential consequences are that other similar failures on safety related 480 Volt AC MCCs (EIIS: B) could result in a loss of safety related equipment important for safe shutdown of either or both units depending on the affected MCC.

These events will not be counted as a safety system functional failure (SSFF) for the NRC performance indicator, based on the engineering analysis that shows there was no loss of ability to fulfill a safety function.

CORRECTIVE ACTIONS

Immediate corrective actions included the repair of 2B246 which has been completed. A plan has been developed to review a sample of the 480 VAC MCC breakers (EIIS: B) and is being tracked by maintenance and system engineering. Maintenance procedures are also being revised to ensure fasteners that are being used to mount components in MCC Buckets protrude approximately two thread lengths through the back of the bucket.

PREVIOUS SIMILAR EVENTS

There are no previous similar events